

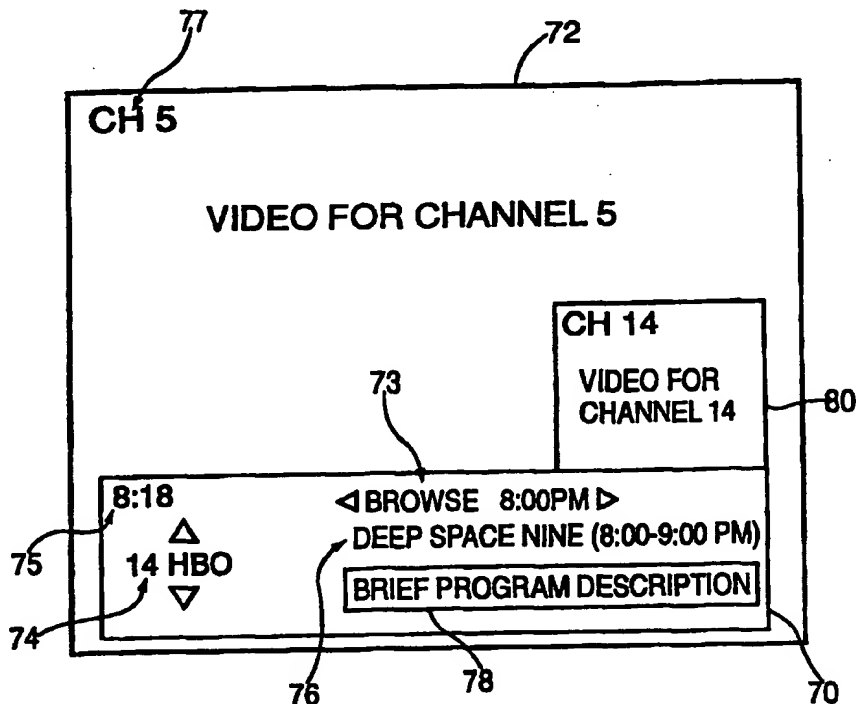
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US99/11016 <b>(22) International Filing Date:</b> 18 May 1999 (18.05.99)  <b>(30) Priority Data:</b> 60/086,051 19 May 1998 (19.05.98) US 09/262,670 4 March 1999 (04.03.99) US  <b>(71) Applicant:</b> UNITED VIDEO PROPERTIES, INC. [US/US]; 7140 South Lewis Avenue, Tulsa, OK 74136 (US).  <b>(72) Inventors:</b> REYNOLDS, Steven, J.; 812 Altair Drive, Littleton, CO 80124 (US). RUDNICK, David, M.; 3049 South Adams Street, Denver, CO 80210 (US). HASSELL, Joel, G.; 8246 Yarrow Court, Arvada, CO 80005 (US). ELLIS, Michael, D.; 1300 Kingwood Place, Boulder, CO 80304 (US).  <b>(74) Agents:</b> SHANAHAN, Michael, E. et al.; Fish & Neave, 1251 Avenue of the Americas, New York, NY 10020 (US).			<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** PROGRAM GUIDE SYSTEM WITH VIDEO WINDOW BROWSING**(57) Abstract**

An interactive television program guide system is provided in which a viewer may direct a television to simultaneously display a selected television program, a program guide display, and a program guide video window. A viewer may use the program guide video window to browse video of programs shown on the program guide display while continuing to view a previously selected program in the background. The program guide display may display video on demand (VOD) programs, programs to be broadcast in the future, and programs currently being broadcast on other channels. The viewer may browse through programs on the program guide display using a variety of keys on a remote control unit. The viewer may direct the program guide to swap audio and video signals back and forth between programs shown in the video window and programs shown on the background screen.



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PROGRAM GUIDE SYSTEM WITH  
VIDEO WINDOW BROWSING

5   Background of the Invention

          This invention relates to interactive television program guides, and more particularly, to television program guides that support a video window function which may be used when browsing for available television programs. A television program, a program guide display and a program guide video window may be displayed on the display screen at the same time.

          For a number of years certain television receivers have been equipped with a picture-in-picture (PIP) capability. In PIP mode, images of one television channel are displayed in the background while a PIP video window containing images of another channel is overlaid on a small area of the background. This feature allows viewers to simultaneously view video of programs being broadcast on two different channels. Television receivers with this capability typically contain two dedicated video tuners, one for

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the PIP window and one for the background screen. Viewers may enter and exit PIP mode by using specified keys on a remote control unit.

Television program guides help television  
5 viewers to select programs of interest. Viewers have traditionally consulted printed television program schedules to determine programs being broadcast at a particular time. Recently, cable, satellite, and broadcast television systems have provided viewers with  
10 an increasingly large number of television channels to choose from. As the number of potential programs of interest to the viewer has increased, interactive electronic program guides have been developed to help viewers determine which programs may be of particular  
15 interest. Such interactive program guides may be implemented using a microprocessor-controlled set-top box that is coupled to the viewer's television set. The set-top boxes receive program information from a central broadcasting center. Program information is  
20 stored in a memory within the set-top box. This information typically includes program titles, broadcast times, channels, program descriptions, etc.

Viewers can enter the "browse mode" of a program guide and use remote control cursor keys to  
25 scan through a list of available programming while still watching television. Once a program of interest has been located, the viewer can use a remote control to command the set-top box to tune to the displayed program listing.

30 Interactive programs guides may be arranged in a variety of formats. Some program guides display programming information as an overlay on top of a

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television channel. This type of arrangement does not allow viewers to browse video of other channels while continuing to view the video of a program in progress. Moreover, if the viewer is interested in video of a certain program listed on the program guide, he or she must first exit the program guide and then tune to that channel by pressing a select key.

Other program guides display a grid of current program listings on the viewer's display screen as an overlay on top of a television channel. As described in U.S. patent application Serial No. 09/054,917, filed April 2, 1998, the viewer may scroll a highlight region through the program listings while monitoring the program to which the system is tuned in a quarter-screen window. A text description of the highlighted program is also provided. This type of program guide covers the entire television screen and does not allow the viewer to watch video of two channels concurrently.

It is therefore an object of the present invention to provide a program guide system with improved browsing capabilities.

It is another object of the present invention to provide a program guide system that interacts with a video window so that a viewer may simultaneously view video from two different television channels.

It is another object of the present invention to provide a program guide system that allows a viewer to view both information about and video of a program to be shown at a future time.

It is further object of the present invention to provide a program guide system which allows a viewer

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to swap television programs back and forth between a program shown in a program guide video window and a program shown on a main video screen without having to exit the program guide.

5           It is yet another object of the present invention to provide a program guide system which allows a viewer to the switch audio signal broadcast by a television back and forth between a program shown on a program guide video window and a program shown on a  
10 background screen without having to exit the program guide.

#### Summary of the Invention

These and other objects of the invention are accomplished in accordance with the principles of the  
15 present invention by providing an interactive television program guide system with a video window capability. The viewer may direct the program guide to display a program guide video window that contains video for a program currently being broadcast on  
20 another channel or a video clip of a program to be shown sometime in the future.

The program guide display of the present invention contains information for programs that are shown on particular channels during certain time  
25 intervals. Information about programs being shown at other times or on other channels is not displayed. The viewer may obtain information about available programming by browsing through channels on the program guide using cursor keys and/or numeric keys.

30           The viewer may direct the program guide to display a program guide video window on the viewer's

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television screen. The program guide video window may be activated and deactivated using any suitable means such as pressing a key on a remote control unit. The program guide video window may be used to browse video of programs currently shown on other channels, to browse video clips of future programs, or to browse programming that is available "on demand" (VOD programs). When the program guide display and the video window are active, the program guide may re-proportion the amount of screen area used by the current channel such that the program guide display, the video window, and current channel are displayed unobscured. However, if desired, the program guide display and the program guide video window may be superimposed on a portion of the viewer's television screen, blocking certain portions of the current channel. Both of these screen formats are arranged such that the viewer may continue to watch the current channel while the program guide and the program guide video window are displayed. Thus, the viewer may continue to watch one program while browsing video of other programs. As the viewer browses through other available programming, the contents of the program guide video window may be updated to match the program currently shown on the program guide.

The program guide display may also include brief text descriptions of the displayed programs. When the viewer browses through available programming with remote control keys, the brief descriptions may be automatically updated to correspond to the displayed programs.

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The program guide may provide a swap feature which can be used to exchange a program shown in the program guide video window with a program shown on the main display screen. The viewer may direct the program  
5 guide to swap these programs using any suitable means such a pressing a swap key on a remote control unit. The "program swap" may be reversed by once again pressing (toggling) the swap key. One benefit of this feature is that it allows a viewer to directly tune the  
10 main display screen to a program of potential interest without having to exit the browse mode.

The program guide may also provide an audio select feature that can be used when both the program guide video window and the program guide display are  
15 active. The audio select feature enables the viewer to choose which audio signal is to be broadcast by the television, the audio signal from a program shown on the main display screen or the audio signal from a program shown in the program guide video window. The  
20 viewer may switch back and forth between these two audio signals by pressing an audio select key on a remote control unit. This allows a viewer to browse both the audio and video of a potential program of interest without having to exit the program guide.

25 Further features of the invention, its nature and various advantages will be more apparent from the accompanying drawings and the following detailed description of the preferred embodiments.

#### Brief Description of the Drawings

30 FIG. 1 is a display screen of a conventional program guide having a program list with a highlight



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region and a video window that contains programming that is always synchronized with the highlight region.

FIG. 2 is a display screen of a conventional program guide having a browse feature with which the viewer may view the titles of programs on channels other than the channel to which the system is presently tuned.

FIG. 3 is a diagram of a system in which an interactive television program guide is implemented in accordance with the present invention.

FIG. 4 is a diagram of an illustrative remote control for use with the program guide system of the present invention.

FIG. 5a is an illustrative display screen of a program guide in accordance with the present invention showing the area occupied by the current channel reduced to accommodate the program guide display.

FIG. 5b is another illustrative display screen of a program guide in accordance with the present invention showing the program guide display superimposed on the current channel.

FIG. 6a is an illustrative display screen of a program guide in accordance with the present invention showing the area occupied by the current channel reduced to accommodate both the program guide display and the program guide video window.

FIG. 6b is an illustrative display screen of a program guide in accordance with the present invention showing the program guide display and the program guide video window superimposed on the current channel.

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FIG. 7 is an illustrative display screen of a program guide in accordance with the present invention showing that the program displayed in the program guide video window may be automatically updated to correspond to the program currently shown on the program guide display.

FIG. 8 is an illustrative display screen for a video-on-demand program guide in accordance with the present invention.

FIG. 9 is an illustrative display screen for a video-on-demand program guide in accordance with the present invention showing the area occupied by the current channel reduced to accommodate both the video-on-demand program guide display and the program guide video window.

FIGS. 10-12 are flow charts illustrating steps involved in providing browsing display screens in accordance with the present invention.

#### Detailed Description of the Preferred Embodiments

Conventional program guide systems have program listing display screens that allow viewers to browse for programming of interest. As shown in FIG. 1, one such conventional program guide displays a grid of television program listings and a video window 12. In the horizontal dimension, program listings in the grid are organized by their scheduled broadcast time (e.g., 7:00, 7:30, and 8:00). In the vertical dimension, program listings are organized in channel order. The viewer may view information for additional channels and times by scrolling or panning highlight region 14 through the listings in grid 10. Video of a

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selected program may be displayed in video window 12 if the selected program is currently being broadcast. A text description of selected programs may be displayed in description window 16.

5           There are a number of disadvantages associated with the arrangement of FIG. 1. In particular, the program guide shown in FIG. 1 fills the entire display screen. This prevents the viewer from viewing a previously selected television channel while  
10   browsing for additional programming of interest.

          Another conventional program guide arrangement is shown in FIG. 2. In this arrangement, the viewer may invoke browse mode when it is desired to browse through program listings while continuing to  
15   view the current channel. The program guide presents a browse display 20 that is overlaid on top of a portion of the current channel 22. The viewer may view single program titles 24 for channels other than the current channel 22 and at time intervals other than the current  
20   browse time 28 using cursor keys to change browse channel 26 and/or browse time 28.

          However, the browse arrangement of FIG. 2 does not allow the viewer to watch video from more than one channel at a time. When a program of potential  
25   interest is found, the viewer must exit browse mode and tune to that program in order to view the video of that program. If the viewer still desires to browse other programs, he or she must re-enter the browse mode and repeat this tentative selection process over and over  
30   again. This tends to make browsing through a number of programs time consuming. The viewer also cannot view video of programs to be shown in the future.

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In contrast, the present invention provides a program guide having a browsing display that allows a viewer to browse through a list of available programs, select a program of interest, and view video of that program in a program guide video window while continuing to view a previously selected television channel. The program guide display may be a single cell in width (i.e., in the time dimension) and a single cell in length (i.e., in the channel dimension). Or, if desired, multiple cells may be displayed in either or both the time and channel dimensions. A brief text program description may also be provided in the cell for displaying a description of the currently listed program. If the viewer desires to watch video of a listed program, the viewer may invoke a program guide video window to display the selected program without exiting the browse display. This may be accomplished by pressing a key on a remote control unit such as a video window key.

An illustrative program guide system 30 that may be used with the present invention is shown in FIG. 3. Main facility 32 contains a program guide database 34 for storing program guide information such as television program guide listings data, pay-per-view ordering information, television program promotional information, etc. Information from database 34 may be transmitted to television distribution facility 36 via communications link 38. Link 38 may be a satellite link, a telephone network link, a cable or fiber optic link, a microwave link, a combination of such links, or any other suitable communications path. If it is desired to transmit video signals over link 38 in

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addition to data signals, a relatively high bandwidth link such as a satellite link is generally preferable to a relatively low bandwidth link such as a telephone line.

5           Television distribution facility 36 is a facility for distributing television signals to users, such as a cable system headend, a broadcast distribution facility, or a satellite television distribution facility.

10           The program guide information transmitted by main facility 32 to television distribution facility 36 may include television program listings data for current programs, future programs, and video-on-demand (VOD) programs. The television program listings data  
15 for each program may include (but is not limited to) the title of the program, the channel for the program, a scheduled broadcast time (start time) and an ending time (or duration). Other typical program data may include ratings, critics ratings, brief text  
20 descriptions, genres (sports, movies, children, etc.), actors, etc. Transmitted program information may also include advertising information and pay program data such as pricing information for individual programs and subscription channels, time intervals for ordering  
25 programs and channels, telephone numbers for placing orders that cannot be impulse ordered, etc.

          Television distribution facility 36 distributes television programming and program guide information to the viewer television equipment 40 of  
30 multiple users via communications paths 42. For example, television programming may be distributed over analog television channels and program guide data may

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be distributed over an out-of-band channel on paths 42. Data distribution may also involve using one or more digital channels on paths 42. Such digital channels may also be used for distributing television programming and other information. Viewer television equipment 40 typically contains set-top boxes 44. Viewer television equipment may also be suitable equipment into which circuitry similar to set-top box circuitry has been integrated, an advanced television receiver (such as HDTV), a personal computer television (PC/TV), or any other suitable television equipment. Multiple television and audio channels (analog, digital, or both analog and digital) may be provided to set-top boxes 44 via communications paths 42. If desired, program listings and other information may be distributed by one or more distribution facilities that are similar to but separate from television distribution facility 36 using communications paths that are separate from communications paths 42.

It will be understood that program guide system 30 is just one example of a program guide system that may be used in accordance with the present invention. Any other suitable program guide system may be used if desired. For example, a client-server type configuration that receives data from a high speed communications link could be used. One benefit of such a system is that it may eliminate the need to store program guide information in the viewer's set-top box.

Certain functions such as pay program purchasing may require set-top boxes 44 to transmit data to television distribution facility 36 over communications paths 42. For example, if a viewer

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wanted to order a VOD program, data from set-top box 44 may have to be transmitted to distribution facility 36. If desired, such data may be transmitted over telephone lines or other separate communications paths. If

5 functions such as these are provided using facilities separate from television distribution facility 36, some of the communications involving set-top boxes 44 may be made directly with the separate facilities.

Each viewer television equipment 40 has the  
10 capability to simultaneously receive, decode and display two separate video signals. For example, viewer television equipment 40 may use a two-tuner set-top box. The tuners may have analog, digital, or mixed analog and digital capabilities. If desired any other  
15 suitable arrangement may be used to handle the simultaneous display of two video signals.

Program guide data is distributed to viewer television equipment 40 periodically. Television distribution facility 36 may also poll viewer  
20 television equipment 40 periodically for certain information (e.g., pay program account information or information regarding programs that have been purchased and viewed using locally-generated authorization techniques). Main facility 32 preferably contains a  
25 processor to handle information distribution tasks. Each viewer television equipment 40 preferably contains a processor to handle tasks associated with implementing an interactive television program guide on the viewer television equipment 40. Television  
30 distribution facility 36 may contain a processor for tasks associated with monitoring a viewer's interactions with the interactive program guide

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implemented on set-top boxes 44 and for handling tasks associated with the distribution of program guide data and other information to viewer television equipment 40.

5           Each set-top box 44 in viewer television equipment 40 may be connected to a videocassette recorder 46 and a home storage device 45. Video cassette recorder 46 allows selected television programs to be recorded. Each videocassette recorder  
10 46 may be connected to a television 48. To record a program, set-top box 44 tunes to a particular channel and sends control signals to videocassette recorder 46 (e.g., using an infrared transmitter) that direct  
15 at the appropriate times. Program guide system 30 may store certain information such as VOD programs and VOD program data in home storage device 45 via set top box 44.

          During use of the interactive television  
20 program guide implemented on set-top box 44, television program listings and other information may be displayed on television 48. Such program guide displays may be presented on a television screen so as not to obscure a program to which the viewer has tuned with set-top box  
25 44, or if desired, may be presented as an overlay on top of a portion of a television program. Each set-top box 44, videocassette recorder 46, and television 48 may be controlled by one or more remote controls 50 or any other suitable viewer input interface such as a  
30 wireless keyboard, mouse, trackball, dedicated set of buttons, etc.



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An illustrative remote control 50 is shown in FIG. 4. During normal operation, the viewer may use any suitable key to toggle the program guide display on and off the main display screen. For example, the  
5 viewer may use browse key 55, cursor keys 54 or an on-screen button (not shown). Channel up and down keys (channel keys) 52 may be used to change the channel to which set-top box 44 is tuned. VOD browse key 63 may be used to enter and exit video-on-demand (VOD) browse  
10 mode. Play key 58 may also be used to enter VOD browse mode. Info key 61 may be used to obtain more detailed information about a program and/or to view other available options. Up and down cursor keys 54a and 54b may be used to vertically scroll through the available  
15 channels on the program guide. Left and right cursor keys 54c and 54d may be used to change the time interval for which programming is shown on the program guide. Select key 62 may be used to obtain more information about a particular program or to make  
20 selections such as when ordering VOD programs by selecting one such VOD program from the available program listings. Numeric keys 60 may be used to directly select a desired channel during both normal television viewing mode and browsing mode. Exit to TV  
25 key may be used to exit browse mode and return to normal television viewing mode. While the program guide video window is active, audio select key 53 may be used to switch the audio signal being broadcast by the television back and forth between the main screen  
30 audio signal and the video window audio signal. Also while program guide video window 80 is active, swap key 57 may be used to interchange or "swap" the programs

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shown on the main display screen and the program guide video window. When browsing through programming to be shown in the future, the viewer may request a video clip of future programming by using future video key 56  
5 or video window key 51. Various other keys (not shown) may be used for functions such as controlling power, videocassette recorder (VCR) functions, volume control, etc. The keys for remote control 50 of FIG. 4 represent just one illustrative example of a suitable  
10 remote control arrangement. Alternate labeling and key placement may be used if desired. For example, some or all of the keys may be implemented as on-screen buttons. Furthermore, remote control 50 need not necessarily be remote, any suitable input method may be  
15 used if desired.

As shown in FIG. 5a, the viewer may direct set-top box 44 to present program guide display 70 on main display screen 72. Set-top box 44 may re-proportion (i.e., shrink) the amount of screen area  
20 used by current channel 77 (channel 5) such that main display screen 72 displays both program guide display 70 and current channel 77 unobscured. However, if desired, program guide display 70 may also be superimposed on top of a portion of current channel 77  
25 (channel 5) as shown in FIG. 5b.

Program guide display 70 may be invoked using any suitable technique such as by pressing a button on remote control 50. The viewer may browse through program titles 76 by changing browse channel 74  
30 and/or browse time 73 while continuing to view a previously selected television program on display screen 72.

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Although the program guide display 70 shown in FIGS. 5a and 5b is only a single cell or element in width (i.e., in the time dimension), and a single cell or element in length (i.e., in the channel dimension), it may also be displayed as multiple cells in either or both dimensions (not shown). Program guide 70 preferably includes information about the program(s) shown on the selected channel(s) during the selected time interval(s) (i.e., the programs being provided by television distribution facility 36 of FIG. 3 via cable, wireless cable, satellite, or traditional broadcasting) and may include additional information such as program previews, advertising, etc. (not shown).

Each cell in program guide display 70 may include a program description box 78 that contains a brief text description of the program title(s) currently shown on guide 70. For example, in the arrangement shown in FIG. 5a, the program title "Babylon 5" is shown, so program description box 78 contains a brief text description of the Babylon 5 program. The viewer may press info key 61 on remote 50 (FIG. 4) to obtain more detailed information about that program and/or to view other available options. Select key 62 or on screen button may be used to select the other options.

The viewer may navigate through the available program listings without exiting the program guide display. For example, a viewer may scroll through program listings by using up and down cursor keys 54a and 54b (FIG. 4). Program guide display 70 may also be

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directly commanded to a particular channel of interest using numeric keys 60.

If a viewer who is browsing the program listings on program guide display 70 becomes interested in a particular program, the viewer can direct the program guide to invoke program guide video window 80 to display video for that program. For example, in FIG. 6a, assume the viewer becomes interested in a program on channel 11. By pressing a key such as video window key 51 (FIG. 4), the viewer can direct the program guide to make program guide video window 80 appear and display video for the new channel of interest (channel 11). This allows the viewer to simultaneously view video from one channel on the main display screen 72 (channel 5) and video from a second channel (channel 11) in program guide video window 80. When the viewer no longer desires to use program guide video window 80, it may be deactivated by once again pressing (togglng) video window key 51. In addition, program guide video window 80 may be automatically activated upon invoking program guide display 70 or deactivated depending upon the availability of video for the programs displayed on guide 70.

Program guide video window 80 may be presented on main display screen 72 in various formats. This is illustrated in FIGS. 6a and 6b. For example, in FIG. 6a, the amount of screen area occupied by current channel 77 (channel 5) may be reduced so that program guide display 70, current channel 77, and program guide video window 80 are displayed unobscured. In alternate embodiments, program guide video window 80 and/or program guide display 70 may be superimposed on

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top of a portion of current channel 77 (channel 5) as shown in FIG. 6b.

As the viewer browses the program listings with cursor keys 54 or numeric keys 60, the content of program guide video window 80 may change to reflect the program shown on the program guide. For example, in the arrangement shown in FIG. 6a, the program "Star Trek" is shown on program guide display 70, so program guide video window 80 displays video of the Star Trek program. When another program is browsed such as the "Deep Space Nine" program on channel 14, program guide video window 80 may automatically tune to channel 14 and display video of the Deep Space Nine program (shown in FIG. 7). Thus the content of program guide video window 80 may be in synchronization with the current program shown on program guide display 70.

A viewer may also be permitted to view video of a given program in program guide video window 80 while continuing to browse through other program listings on program guide display 70. For example, in FIG. 7, a viewer may direct the program guide to keep video window 80 tuned to channel 14 and browse through other channels on program guide display 70. One way this may be accomplished is by allowing a viewer to press a key on remote control 50 such as select key 62 to "lock" program guide video window 80 to a certain channel and then use the up and down cursor keys 54a and 54b (FIG. 4) to browse through additional channels on program guide display 70. The viewer may once again bring program guide video window 80 and program guide display 70 into synchronization by toggling select key 62. This feature allows the viewer to simultaneously

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view programs on main display screen 72 and program guide video window 80 while browsing through program listings with program guide display 70.

While in browse mode, the television program  
5 for the channel to which set-top box 44 is currently  
tuned continues to be displayed on the main display  
screen 72. This is shown in FIGS. 5-7. Although the  
viewer has scrolled through several channels on program  
guide display 70, the video on main display screen 72  
10 remains tuned to channel 5. The content of main  
display screen 72 is therefore not always in  
synchronization with the program currently shown on  
program guide display 70. However, each time the  
viewer scrolls the program guide to a new program  
15 listing, program description box 78 is updated to  
display information for the new program listed in  
program guide display 70. As a result, the viewer can  
watch a selected television channel while browsing  
automatically updated video and text descriptions of a  
20 program on another channel.

The browse feature may be used to view  
information about programming to be shown at different  
times. This may be accomplished by using right and  
left cursor keys 54c and 54d to adjust time interval  
25 73. Time interval 73 indicates the time range for  
which programming information is being displayed. As  
shown in FIG. 5, time interval 73 is set to the 7:00 PM  
time slot, therefore, program guide display 70 displays  
information about programming to be shown on channel 9  
30 at 7:00 PM. If desired, the viewer may adjust time  
interval 73 to a particular time and thus obtain  
information about programming in that time slot. For

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example, in FIG. 5, if the viewer presses cursor key 54c once, time interval 73 may increment to 7:30 PM. Program guide display 70 will automatically update and display information about the program to be shown on  
5 channel 9 at 7:30 PM. If cursor key 54c is pressed again, browse time interval 73 may increment to 8:00 PM, and information is displayed about the program to be shown in that time slot, etc. Left cursor key 54d may operate in a similar fashion to decrement time  
10 interval 73. Each time the viewer changes the value of time interval 73, program guide display 70 automatically updates to display information for the program to be shown at that time.

Program guide display 70 need not remain set  
15 to a particular channel in order for the viewer to view information about future programming. The viewer may set time interval 73 to a particular time in the future and scroll through the different channels 74 available in program guide display 70. For example, in FIG. 5,  
20 current time indicator 75 shows the current time as 6:17 PM. Time interval 73 is set to a future time slot (7:00 PM). If desired, the viewer may browse through the channels to obtain information about programming to be shown at 7:00 PM.

25 If a viewer who is browsing through future program listings becomes interested in a particular program, the viewer can direct the program guide to activate program guide video window 80 to display a video clip for that program. For example, in FIG. 5a,  
30 if the viewer becomes interested in the Babylon 5 program, he or she may press a key such as the future video key 56 (FIG. 4) to request a video clip of that

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program. If a video clip for that program is available, program guide video window 80 may appear and display that clip. If desired, the remote control key used to request video clips may be the same as the key  
5 used to invoke program guide video window 80 (i.e., video window key 51 shown in FIG. 4). In this case, the program guide may automatically check the broadcast time of the selected program to determine if the selected program is currently being broadcast or if a  
10 video clip for that program needs to be requested.

Viewer television equipment 40 may contain a two-tuner set-top box 44 or other suitable equipment which has the capability to receive and decode two  
15 separate video signals and simultaneously display one of those video signals on main display screen 72 and the other signal in program guide video window 80. If the viewer is watching a program on main video screen 72 and wants to view video of another program currently being broadcast, the viewer may direct set-top box 44  
20 to tune to and display that channel in program guide video window 80.

However, in order to watch a video clip of a future program, the viewer may need to direct the program guide to request a video clip for that program.  
25 Such video clips may be provided from a video server or other suitable television distribution device located at distribution facility 36 or at a network node associated with television distribution facility 36. Program guide display 70 may display an icon such as  
30 icon 79 to indicate that a particular program has an available video clip. If a video clip is available for the selected program, the server routes a signal of



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that clip to the viewer's location where it is displayed in program guide video window 80.

If desired, alternate architectures for delivering video clips may be used. For example, a video distribution system may constantly broadcast video streams that include a list of multiple video clips. The program guide may scan the list and select the video clip with the desired video and the most desirable start time. That video clip would then be displayed in program guide video window 80 when broadcast. One benefit of such a scheme is that it requires no return path from user television equipment 40 and may reduce the amount of data the program guide is required to manage and store.

Thus, a viewer may simultaneously view video of a channel currently being broadcast on the main display screen 72 (channel 5 in the FIG. 5a example) and a video clip of a future program (Babylon 5) in program guide video window 80. When the viewer no longer wants to view the video clip, program guide video window 80 may be deactivated using any suitable technique such as toggling video window key 51. Alternatively, the video clip may be shown only once, and then program guide video window 80 is automatically deactivated. If desired, a single frame of video may be used in place of a video clip.

The program guide may have a swap feature that can be used while program guide video window 80 and program guide display 70 are active. The swap feature allows the viewer to interchange a program shown on main display screen 72 with a program shown in program guide video window 80 (and vice versa). For

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example, in FIG. 6a, main display screen 72 is tuned to a program on channel 5 and program guide video window 80 is tuned to a program on channel 11. After browsing the video of channel 11, a viewer may desire to view  
5 that channel on main display screen 72. This may be accomplished by pressing a key on remote 50 such as swap key 57 (FIG. 4). When swap key 57 is pressed, program guide video window 80 automatically tunes to channel 5 and main display screen 72 automatically  
10 tunes to channel 11, thus "swapping" the two channels. Program guide display 70 may update and display information for the channel previously shown on main screen 72 (channel 5). This feature permits the viewer to directly tune main screen 72 to a new channel of  
15 interest (i.e., without having to exit the browse mode and then tune main display screen 72 to the desired channel). Program guide 70 may automatically swap the programs back when either browse channel 74 or time interval 73 are changed.

20 The program guide may also have an audio select feature that can be used while program guide video window 80 is active. The audio select feature enables the viewer to choose which audio signal is to be broadcast by the television, either the audio signal  
25 from a program on main display screen 72, or the audio signal from a program in program guide video window 80. For example, in FIG. 6a, main display screen 72 is tuned to channel 5 and program guide video window 80 is tuned to channel 11. Assume program guide 70 has been  
30 initially set by the viewer to broadcast the audio signal of the program being shown on main screen 72 (channel 5). After browsing the video of a program in

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program guide video window 80, the viewer may want to listen to the audio of that program. By pressing a key on remote 50 such as audio select key 53 (FIG. 4) the audio signal being broadcast by television 48 switches  
5 from the program shown on main screen 72 (channel 5) to the program shown on program guide video window 80 (channel 11). A viewer can therefore browse both the audio and video of a potential program of interest without having to exit the browse mode. The audio  
10 signal of main display screen 72 may be returned by once again pressing (togglng) audio select key 53.

The viewer may be allowed to select the default source of the audio signal. For example, the viewer may set the program guide to broadcast the audio  
15 signal from video window 80 whenever video window 80 is activated. In this case, the viewer may use audio select key 80 to swap the audio signals so that the audio signal broadcast by television 48 is from the program shown on main display screen 72. Moreover, the  
20 viewer may be allowed to select whether or not program guide 70 automatically swaps the audio signal back when either browse channel 74 or time interval 73 are changed.

The program guide may also offer a browse  
25 feature for programming which may be available "on demand." Such programming may be known as "video on demand" or "VOD" and may include programs that are available at any time for viewing. This allows the viewer to select and watch certain programs at his or  
30 her convenience. VOD programs may include "pay-per-view" or subscription services. These programs may be stored in a database of a video server located at

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suitable locations in cable system 30 such as at television distribution facility 36 or at a network node associated with television distribution facility 36.

5           As shown in FIG. 3, program guide system 30 may also store VOD programs and VOD program data in home storage device 45 via set top box 44. Home storage device 45 may include a writable optical storage device (such as a DVD player capable of  
10 handling recordable DVD discs), a magnetic storage device (such as a disk drive or digital tape), or any other suitable analog or digital storage device. Home storage device 45 may support a directory structure containing information associated with stored entries.  
15 This directory information may be stored in one location, for example at the beginning or the end of the storage device. The directory information can also be distributed (e.g., by storing a portion of such information at the same location as each entry). For  
20 removable storage media like DVDs, each storage unit may have its own directory information.

Home storage device 45 can be contained in set-top box 44 or it can be an external device connected to set-top box 44 via an output port and  
25 appropriate interface. If home storage device 45 is a digital storage device, processing circuitry in set-top box 44 may format the video, audio and data signals received from television distribution facility 36 into a digital file format. The file format may be an open  
30 file format such as the Motion Pictures Expert Group (MPEG) MPEG-2 standard. The resulting data may be transmitted to home storage device 45 via an

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appropriate bus (e.g., a bus using the IEEE 1394 standard), and is stored on digital storage device 45.

As shown in FIG. 8, set-top box 44 can be directed to present VOD program guide display 90 on  
5 main display screen 72 so that the viewer can scroll through a list of VOD programs while simultaneously viewing a television program on main display screen 72. The viewer may enter VOD browse mode using any suitable technique. For example, VOD browse mode may be entered  
10 directly by using a dedicated key on remote control unit 50 such as play key 58 (FIG. 4) or by pressing on-screen button on the program guide display (not shown). VOD browse mode may also be accessed by first entering normal browse mode and then selecting a designated VOD  
15 channel using the up and down cursor keys 54a and 54b or numeric keys 60.

VOD program guide 90 and program guide video window 80 may be presented on main display screen 72 in various formats. This is illustrated in FIGS. 8 and 9.  
20 For example, in FIG. 9, the amount of screen area occupied by current channel 77 (channel 5) may be reduced so that VOD program guide display 90, current channel 77, and program guide video window 80 are displayed unobscured. In alternate embodiments, such  
25 as the one shown in FIG. 8, VOD program guide display 90 (and/or program guide video window 80 [not shown]) may be superimposed on top of a portion of current channel 77 (channel 5).

VOD program guide display 90 preferably  
30 contains information about a particular VOD program. If desired, such VOD programs may be organized according to certain categories 92 such as "recent

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releases," "sitcoms," "action/adventure," "comedy," etc. In the example of FIG. 8, the viewer is viewing programs in the comedy category and information is displayed about a particular comedy program that is available on demand. The displayed information may include (but is not limited to) the program title 94 (Bullworth), the length or "run-time" of that program 96 (124 minutes) and the program's rating 98 (TV-MA). More detailed information about a particular program may be available by pressing info key 61 (FIG. 4). Such detailed information may include plot summary, actors and actresses, etc., and may appear on main screen 72 or a separate detailed information screen (not shown).

15           The viewer may scroll through the programs listings 93 in a given VOD category 92 by using any suitable key on remote 50 such as up and down cursor keys 54a and 54b (FIG. 4). VOD category 92 may be changed by using any suitable key on remote 50 such as right and left cursor keys 54c and 54d (FIG. 4). If desired, a VOD program may be ordered by using a key on remote 50 such as select key 62 or an on-screen button which may appear, for example, on the detailed information screen.

25           Some of the steps involved in providing the browsing display features described herein are illustrated in the flow charts of FIGS. 10-12. At step 100, the program guide provides the viewer with an option for invoking either the VOD browsing mode or the normal browsing mode. If the viewer chooses to invoke the normal browsing mode, the program guide displays program guide display 70 on viewer television equipment

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40 at step 101, preferably displaying a program listing reflecting the current channel. If the viewer chooses to invoke the VOD browsing mode, VOD program guide display 90 is displayed on the television at step 106  
5 (see flow chart in FIG. 12).

Assuming the normal browsing mode is chosen, the viewer may set time interval 73 to a time period of interest at step 102a. The viewer may scroll through available program listings in that time period using  
10 cursor and numeric keys without changing the program displayed on main display screen 72 at step 102b. Alternatively, the viewer could first scroll through the program listings at step 102b and then adjust time interval 73 at step 102a.

15 When a program of interest is found, the viewer may activate program guide video window 80 to watch video of that program by pressing a key such as video window key 51. If the viewer is browsing through program listings in a future time slot, the program  
20 guide may automatically request a video clip of a particular program. If the requested video clip is available, it will be displayed in the program guide video window 80 at step 103a. If the viewer is  
25 browsing through program listings in the present time slot, the program guide may automatically tune program guide video window 80 to that channel, and video from that program will be displayed in program guide video window 80 at step 103b.

While at steps 103a and 103b, the viewer may  
30 browse another program by returning to step 102 (with or without program guide video window 80 still active), press audio select key 53, press swap key 57, press

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info key 61, press select key 62 or exit to normal television viewing mode by pressing exit to TV 59 (step 105). Pressing audio select key 53 at steps 103 or 104 causes the audio signal being broadcast by the television to switch back and forth between the program shown on main display screen 72 and the program shown in program guide video window 80 (step 104a). For example, at step 104a the television may be broadcasting the audio signal for the program currently shown in program guide video window 80. However, the viewer may switch back to the audio signal of main screen 72 at step 104a by once again pressing the audio select key.

Pressing the swap key at steps 103 or 104 causes the program shown on main display screen 72 to be interchanged with the program shown in program guide video window 80. For example, with reference to FIG. 7, the program on channel 14 is in program guide video window 80 while the program on channel 5 is on main screen 72. The viewer may switch these programs at step 104b by pressing the swap key.

Pressing the info key at steps 103 or 104 may cause more information about the selected program to be displayed, possibly on a separate detailed information screen (not shown). Pressing the select key at steps 103 or 104 may cause the program displayed in program guide video window 80 to be displayed on main display screen 72 (not shown).

After the selected program has been browsed, the viewer may return to step 102 (with or without program guide video window 80 still active), and browse



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other programs, or exit to normal television viewing by pressing exit to television key 59 (step 105).

As shown in the flow chart of FIG. 12, if the viewer chooses to invoke VOD browsing mode at step 100, VOD program guide display 90 (FIGS. 8 and 9) is displayed on the main video screen at step 106. When VOD program guide display 90 is initially displayed, it may be set to a "default" category and program listing. At step 107a, the viewer may browse through the available program categories using left and right cursor keys 54d and 54c. When a category is chosen, the available programs in that category may be browsed using up and down cursor keys 54a and 54b (step 107b). However, it will be understood that the viewer could first scroll through the program listings in the default category at step 107b and then browse through the available program categories at step 107a.

When a program of interest is found, the viewer has several options. For example, the viewer may: 1) order the program by pressing select key 62 on remote 50, 2) request a video clip of that program by pressing play key 58 or video key 51 (step 109), or 3) request more information about that program by pressing info key 61 (step 108). If a VOD program has been ordered for a future time, the viewer may return to step 107 and browse other VOD programs, or exit to normal television viewing by pressing exit to television key 59. If a VOD program has been ordered for the present time, the viewer may leave browse mode and watch that program. If more information has been requested about a VOD program, any available information will be displayed in guide 90 or may appear

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on an additional detailed information screen (step 108). The viewer may subsequently exit the information screen and return to step 107 by once again pressing the info key 61. If a video clip of a VOD program has  
5 been requested the program guide video window will display the requested clip if it is available at step 109.

While at step 109, the viewer may browse another program by returning to step 107, press the  
10 audio select key, press the swap key, press the info key or order the program. Pressing audio select key 53 at steps 109 or 110 causes the audio signal being broadcast by the television to switch back and forth between the program shown on main display screen 72 and  
15 the video clip shown in program guide video window 80. For example, at step 110 the television may be broadcasting the audio signal for a VOD video clip currently being shown in program guide video window 80. The viewer may switch back to the audio signal of the  
20 regular program shown on main screen 72 at step 110b by once again pressing the audio select key.

Pressing the swap key at steps 110 or 109 causes the program shown on main display screen 72 to be interchanged with the program shown in program guide  
25 video window 80. For example, with reference to FIG. 9, the program on channel 5 is in program guide video window 80 while the video clip for the Bullworth program is on main screen 72. The viewer may switch these programs at step 110 by pressing the swap key.  
30 Pressing the info key at steps 109 or 110 may cause more information about the selected program to be displayed, possibly on a separate detailed information

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screen (not shown). After the viewer has finished  
browsing a selected program, he or she may return to  
step 107 and browse other VOD programs, order the  
program by pressing the select key 62, or exit to  
5 normal television viewing by pressing exit to  
television key 59. In addition, program guide video  
window 80 may be automatically deactivated after the  
video clip is shown.

Although not specifically shown in the flow  
10 charts of FIGS. 10-12, the viewer may at any time exit  
back to the normal television viewing by pressing the  
exit to TV key 59 on remote 50.

The foregoing is merely illustrative of the  
principles of this invention and various modifications  
15 can be made by those skilled in the art without  
departing from the scope and spirit of the invention.

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What is Claimed is:

1. An interactive television program guide system implemented on viewer television equipment having a main display screen, comprising:

means for displaying a given television program on the viewer television equipment;

means for displaying a partial screen program guide display that includes at least one program listing on the viewer television equipment; and

means for displaying a partial screen program guide video window at the same time that the given television program and the program guide display are displayed, the program guide video window displaying a program that corresponds to at least one program listing.

2. The interactive television program guide system defined in claim 1 further comprising means for displaying the program guide display as an overlay on top of said given television program.

3. The interactive television program guide system defined in claim 1 further comprising means for displaying said video window as an overlay on top of said given television program.

4. The interactive television program guide system defined in claim 1 further comprising means for reducing the main display screen area occupied by said television program when said program guide display is active such that said television program may be viewed unobscured.

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5. The interactive television program guide system defined in claim 1 further comprising means for reducing the main display screen area occupied by said television program when said program guide display and said video window are active such that said television program may be viewed unobscured.

6. The interactive television program guide system defined in claim 1 further comprising means for allowing the viewer to browse through additional program listings available in the program guide using remote control keys.

7. The interactive television program guide system defined in claim 1 further comprising means for allowing a viewer to direct the program guide system to display the program guide on said main display screen using a remote control key.

8. The interactive television program guide system defined in claim 1 further comprising means for allowing a viewer to remove the program guide from said main display screen and return to normal television viewing mode using a remote control key.

9. The interactive television program guide system defined in claim 1 further comprising means for allowing a viewer to use a remote control key to display said video window on the main display screen and to remove said video window from the main display screen.

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10. The interactive television program guide system defined in claim 1, wherein the viewer television equipment has an audio signal, the system further comprising means for allowing the viewer to switch the source of the audio signal back and forth between a program shown in a main display screen and a program shown in the video window.

11. The interactive television program guide system defined in claim 1 further comprising means for allowing the viewer to interchange programs shown on the main display screen with programs shown in the video window using a remote control key so that the program originally shown on the main display screen is shown in the video window and the program originally shown in the video window is shown on the main display screen.

12. The interactive television program guide system defined in claim 1 wherein the video displayed by the video window remains in synchronization with the program displayed on the program guide display as the viewer browses through other available program listings on the program guide.

13. The interactive television program guide system defined in claim 1 further comprising a means for allowing the viewer to browse through various available program listings with the program guide display while the video displayed by the video window remains tuned to a previously selected program listing.

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14. The interactive television program guide system defined in claim 1 wherein the means for displaying the program guide video window further comprises means for allowing the viewer to use a remote control key to direct the television to tune the video window to the program listing contained in the program guide display.

15. The interactive television program guide system defined in claim 1 wherein the means for displaying the program guide video window further comprises means for allowing the viewer to use a remote control key to direct the television to tune the video window to the program listing contained in the program guide display and to display the video for that program listing in the video window.

16. The interactive television program guide system defined in claim 1 further comprising means for allowing the viewer to browse video-on-demand programs on said program guide.

17. The interactive television program guide system defined in claim 1 wherein the at least one program listing in the program guide display is a video-on-demand program listing, the system further comprising means for storing video-on-demand programs in a home storage device.

18. The interactive television program guide system defined in claim 1 wherein the at least one program listing in the program guide display is a video-on-demand program listing, the system further

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comprising means for providing a video clip for the video-on-demand program listing in the program guide display.

19. The interactive television program guide system defined in claim 1 wherein the at least one program listing in the program guide display is a video-on-demand program listing, the system further comprising means for providing a video clip for the video-on-demand program listing in the program guide display by allowing the viewer to use a remote control key to direct the program guide to request and display the video clip of the displayed video-on-demand program in the video window.

20. The interactive television program guide system defined in claim 19 further comprising means for indicating that video clips are available for the displayed video-on-demand program listing.

21. The interactive television program guide system defined in claim 20 wherein said indicating means is an icon.

22. The interactive television program guide system defined in claim 1 wherein the at least one program listing in the program guide display is a video-on-demand program listing, the system further comprising means for providing more detailed information about the listed video-on-demand program using a remote control key.



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23. The interactive television program guide system defined in claim 1 wherein the at least one program listing is a video-on-demand program listing, the system further comprising means for placing an order for the video-on-demand program listing.

24. The interactive television program guide system defined in claim 1 further comprising means for displaying said program guide display with a time interval to indicate the time period for which program listings are being displayed.

25. The interactive television program guide system defined in claim 1 wherein the program guide display contains an adjustable time interval for which the at least one program listing is displayed, the system comprising means for allowing the viewer to adjust the time interval to future time periods using remote control keys so that the viewer may browse program listings in said future time periods.

26. The interactive television program guide system defined in claim 25 further comprising means for indicating that video clips are available for the program listings in said future time periods.

27. The interactive television program guide system defined in claim 25 further comprising means for allowing the viewer to view video clips for future program listings contained in the program guide display by using a remote control key to direct the program guide to request and display such video clips in the video window.

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28. The interactive television program guide system defined in claim 26 wherein said indicating means is an icon.

29. A method for using an interactive television program guide system implemented on viewer television equipment having a main display screen comprising the steps of:

simultaneously displaying on the main display screen (a) a television program, (b) a partial screen program guide display including at least one program listing, (c) a partial screen program guide video window displaying a program that corresponds to the at least one program listing; and

allowing the viewer to browse through available program listings in the program guide.

30. The method defined in claim 29 wherein the displaying step further comprises:

displaying the program guide display as an overlay on top of said given television program.

31. The method defined in claim 29 wherein the displaying step further comprises:

displaying the video window as an overlay on top of said given television program.

32. The method defined in claim 29 wherein the displaying step further comprises:

reducing the main display screen area occupied by said television program when said program guide display is active such that said television program may be viewed unobscured.

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33. The method defined in claim 29 wherein said displaying step further comprises:

updating the video shown in said video window to correspond to the program listing currently shown on the program guide display.

34. The method defined in claim 29 wherein said displaying step further comprises:

displaying said program guide on said main display screen when the viewer presses a remote control key.

35. The method defined in claim 29 wherein said displaying step further comprises:

removing the program guide from said main display screen and return to normal television viewing mode when the viewer presses a remote control key.

36. The method defined in claim 29 wherein said displaying step further comprises:

allowing a viewer to use a remote control key to display said video window on the main display screen and to remove said video window from the main display screen.

37. The method defined in claim 29 wherein the viewer television equipment has an audio signal, and wherein said browsing step further comprises:

providing the viewer with an opportunity to switch the source of the audio signal back and forth between a program shown on the main display screen and a program shown in the program guide video window.

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38. The method defined in claim 29 wherein the browsing step further comprises:

providing the viewer with an opportunity to interchange programs shown on the main display screen with programs shown in the program guide video window so that the program originally shown on the main display screen is shown in the program guide video window and the program originally shown in the program guide video window is shown on the main display screen.

39. The method defined in claim 29 wherein the displaying step further comprises:

maintaining the video displayed by the video window in synchronization with the program displayed on the program guide display as the viewer browses through other available program listings on the program guide.

40. The method defined in claim 29 wherein the browsing step further comprises:

providing the viewer with an opportunity to keep the video displayed by the video window tuned to a previously selected program listing and browse through other available program listings on the program guide.

41. The method defined in claim 29 wherein the browsing step further comprises:

allowing the viewer to browse through various available program listings with the program guide display while the video displayed by the video window remains tuned to a previously selected program listing.

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42. The method defined in claim 29 wherein the browsing step further comprises:

allowing the viewer to use a remote control key to direct the television to tune the video window to the program listing contained in the program guide display.

43. The method defined in claim 29 wherein the browsing step further comprises:

allowing the viewer to use a remote control key to direct the television to tune the video window to the program listing contained in the program guide display and to display the video for that program listing in the video window.

44. The method defined in claim 29 wherein the browsing step further comprises:

allowing the viewer to browse video-on-demand programs on said program guide.

45. The method defined in claim 29 wherein the at least one program listing in the program guide display is a video-on-demand program listing, the method further comprising the step of:

storing video-on-demand programs in a home storage device.

46. The method defined in claim 29 wherein the at least one program listing in the program guide display is a video-on-demand program listing, said method further comprising the step of:

providing a video clip for the video-on-demand program listing in the program guide display.

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47. The method defined in claim 29 wherein the at least one program listing in the program guide display is a video-on-demand program listing, said method further comprising the step of:

providing a video clip for the video-on-demand program listing in the program guide display by allowing the viewer to use a remote control key to direct the program guide to request and display the video clip of the displayed video-on-demand program in the video window.

48. The method defined in claim 47 wherein the providing step further comprises:

indicating that video clips are available for the displayed video-on-demand program listing.

49. The method defined in claim 48 wherein the indicating step further comprises using an icon.

50. The method defined in claim 29 wherein the at least one program listing in the program guide display is a video-on-demand program listing, said method further comprising the step of:

allowing the viewer to obtain more detailed information about said listed video-on-demand program using a remote control key.

51. The method defined in claim 29 wherein the at least one program listing in the program guide display is a video-on-demand program listing, said method further comprising the step of:

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allowing a viewer to place an order for the listed video-on-demand program.

52. The method defined in claim 29 wherein the displaying step further comprises:

displaying said program guide display with a time interval to indicate the time period for which program listings are being displayed.

53. The method defined in claim 29 wherein the displaying step further comprises:

displaying the program guide display with an adjustable time interval for which the at least one program listing is displayed and allowing the viewer to adjust the time interval to future time periods using remote control keys so that the viewer may browse program listings in said future time periods.

54. The method defined in claim 53 wherein the displaying step further comprises:

indicating that video clips are available for the program listings in said future time periods.

55. The method defined in claim 53 wherein the displaying step further comprises:

allowing the viewer to view video clips for future program listings contained in the program guide display by using a remote control key to direct the program guide to request and display such video clips in the video window.

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56. The method defined in claim 54 wherein the indicating step further comprises using an icon.



VIDEO FOR HIGHLIGHTED PROGRAM		DESCRIPTION FOR HIGHLIGHTED PROGRAM	
7:03 PM	TIME		
CHANNEL	7:00 PM	7:30 PM 8:00 PM	
4	PROGRAM 1	PROGRAM 2	
5	PROGRAM 1		PROGRAM 2
6	PROGRAM 1	PROGRAM 2	PROGRAM 3

FIG. 1  
PRIOR ART

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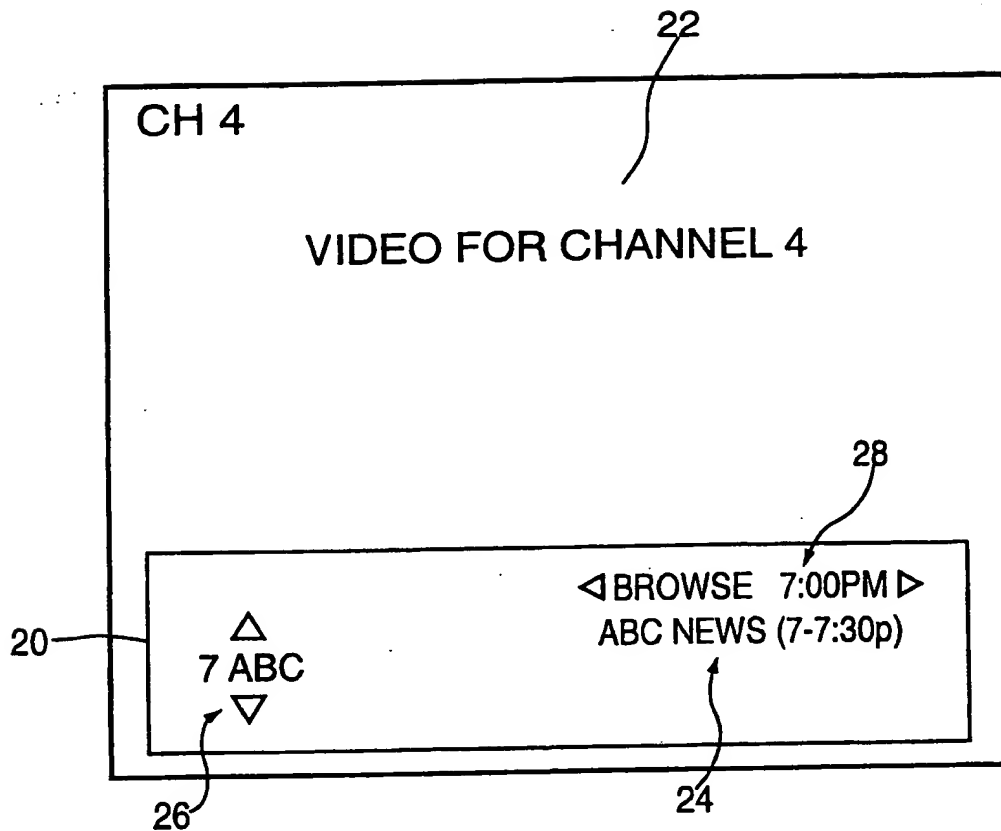


FIG. 2  
PRIOR ART

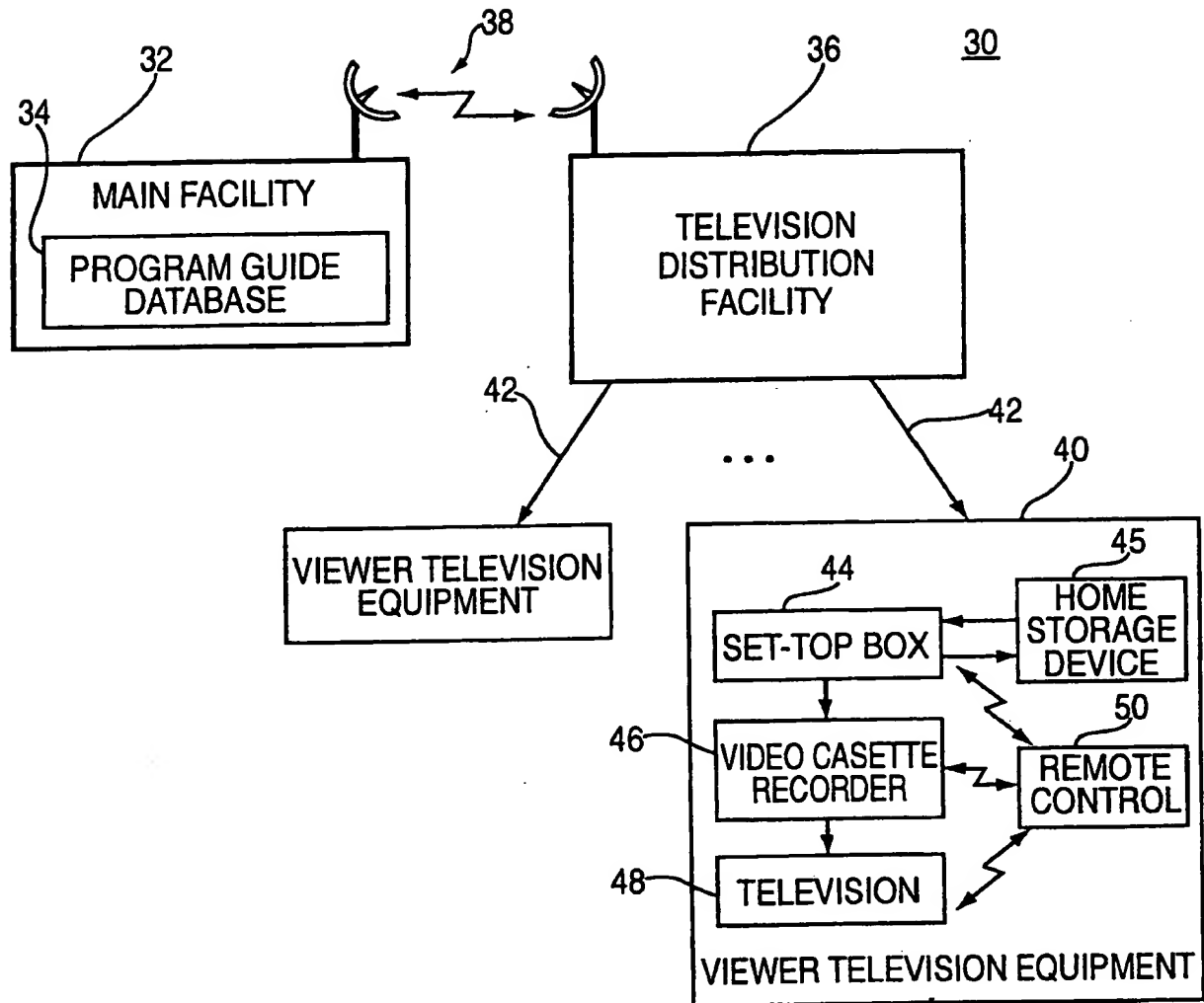


FIG. 3

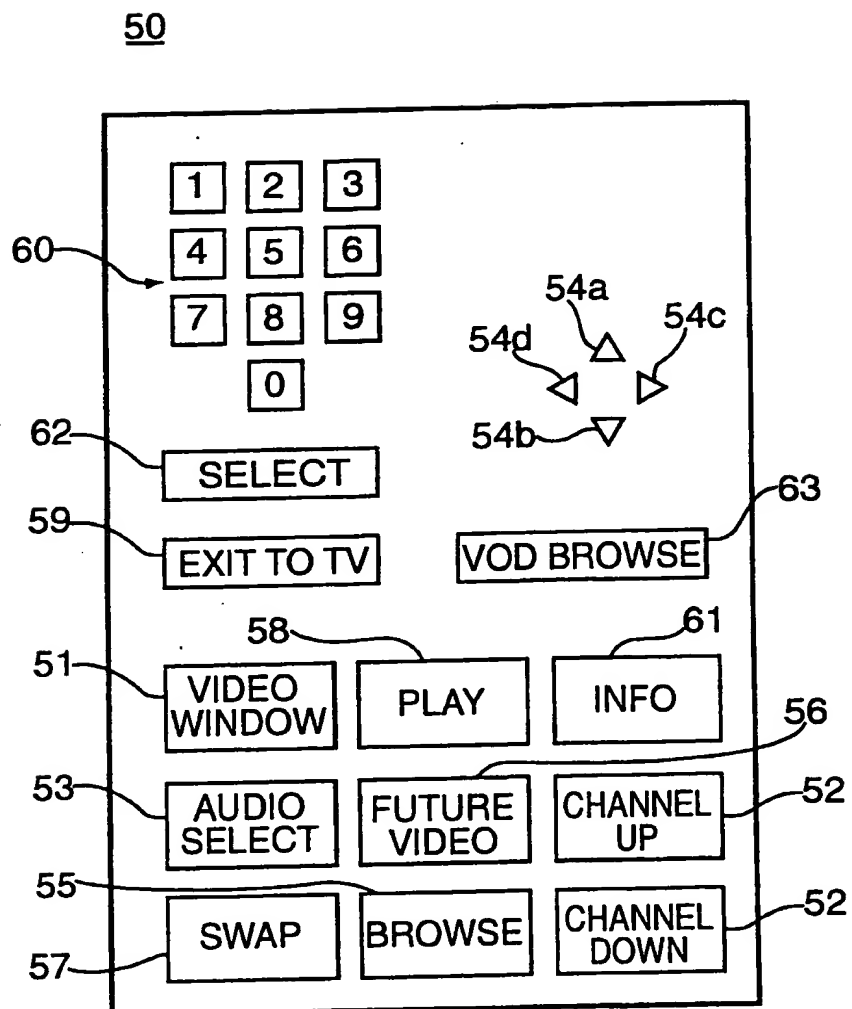


FIG. 4

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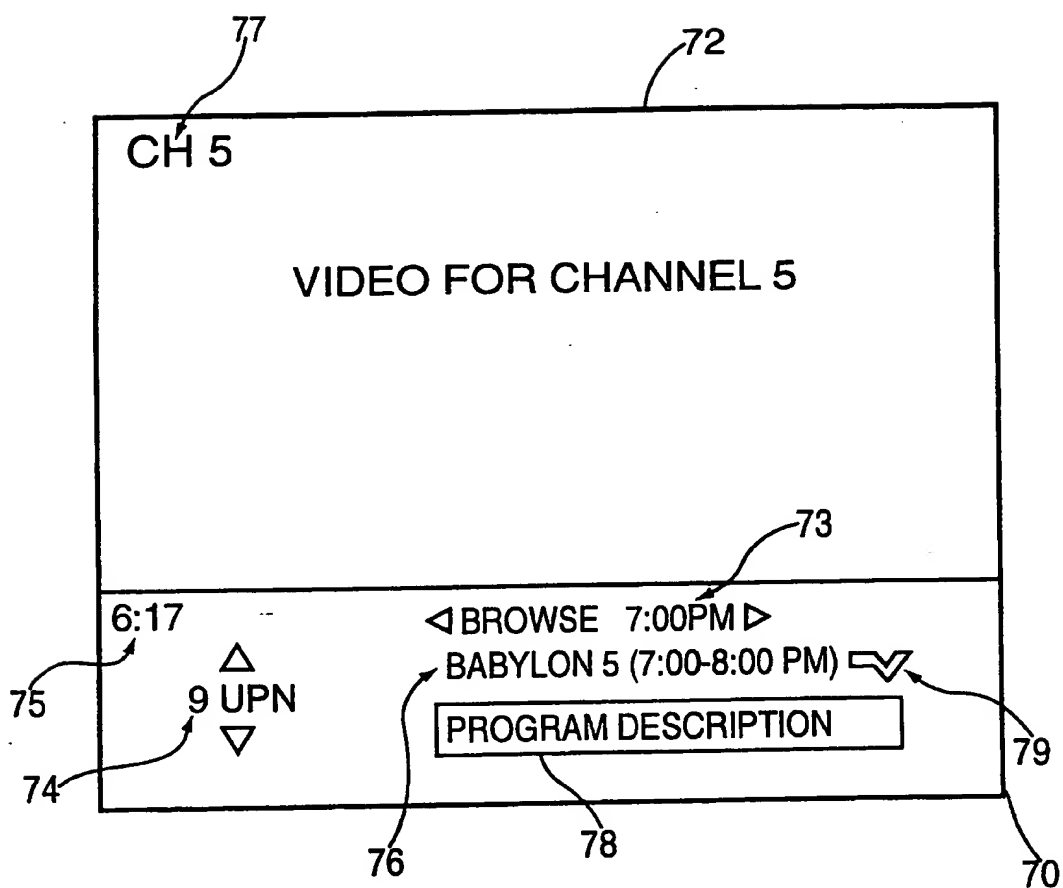


FIG. 5a

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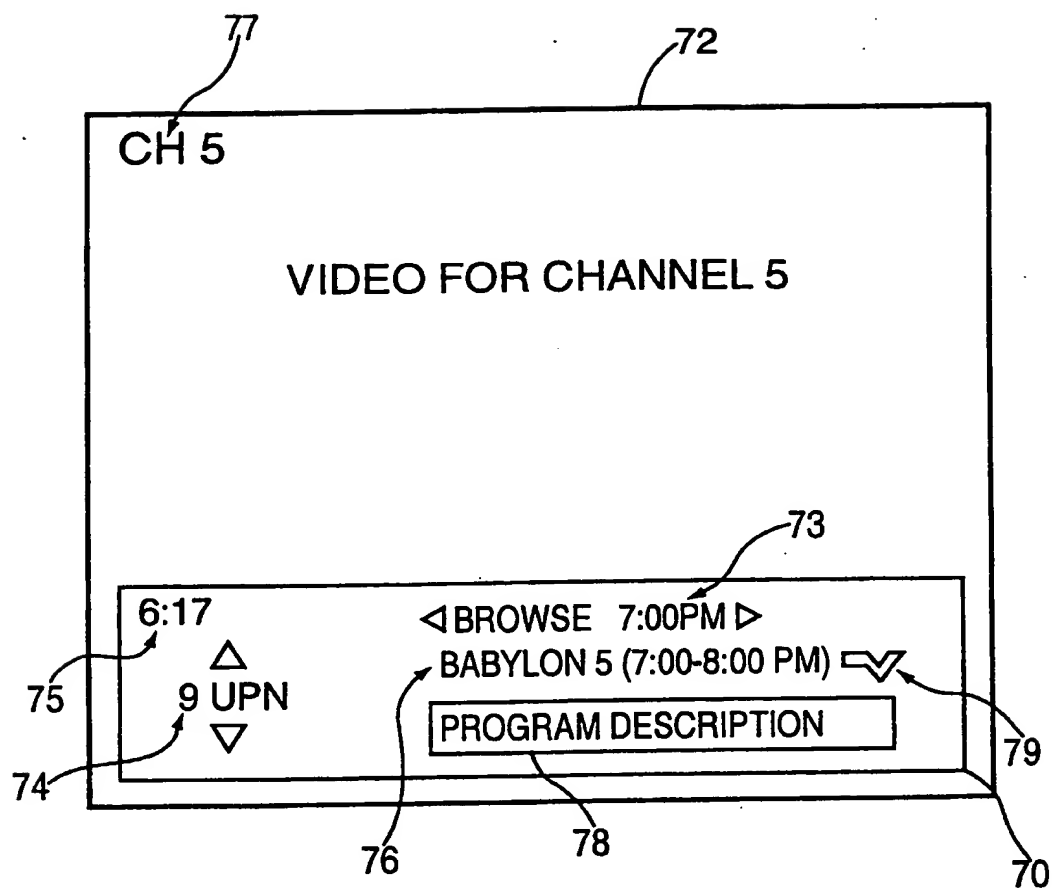


FIG. 5b

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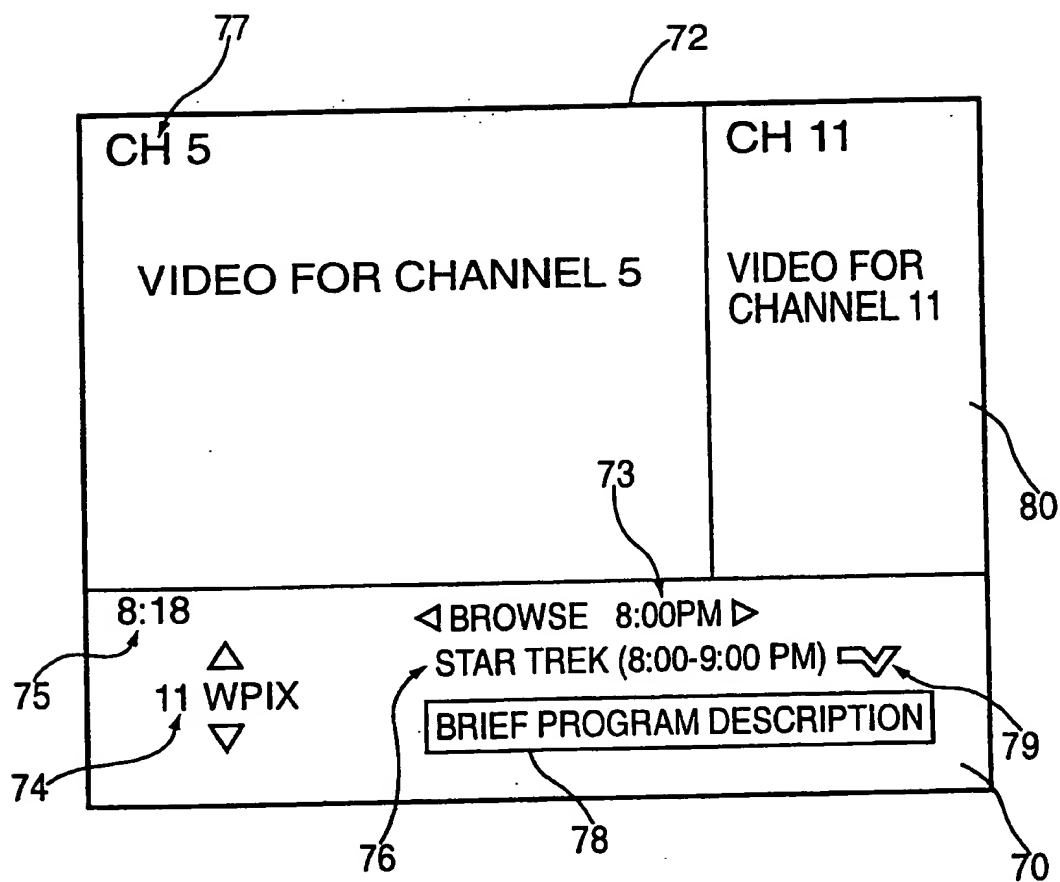


FIG. 6a

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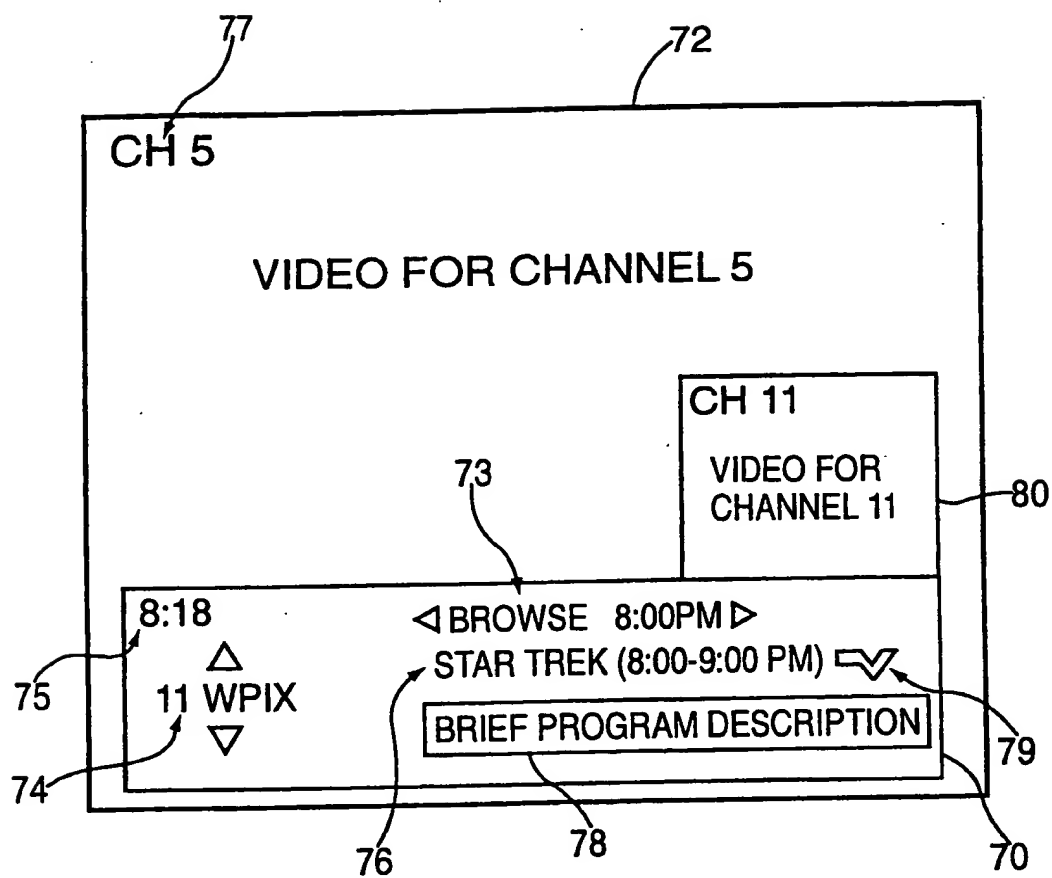


FIG. 6b



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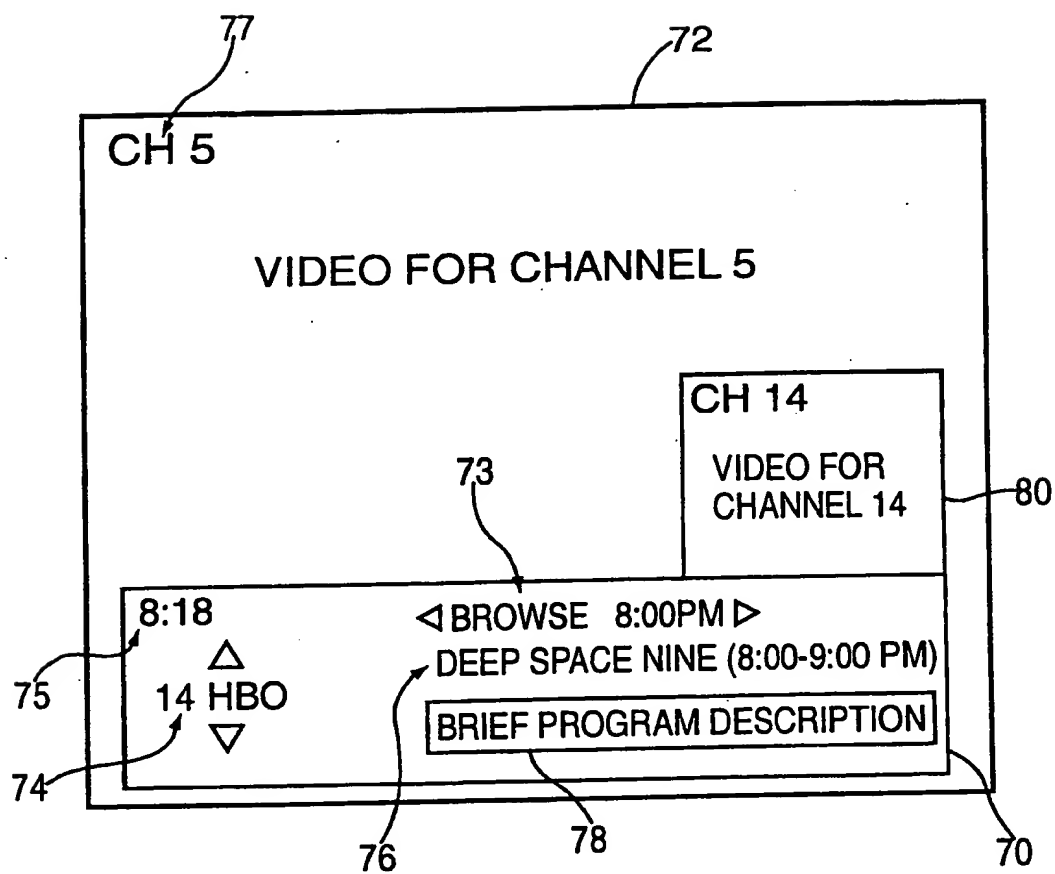


FIG. 7

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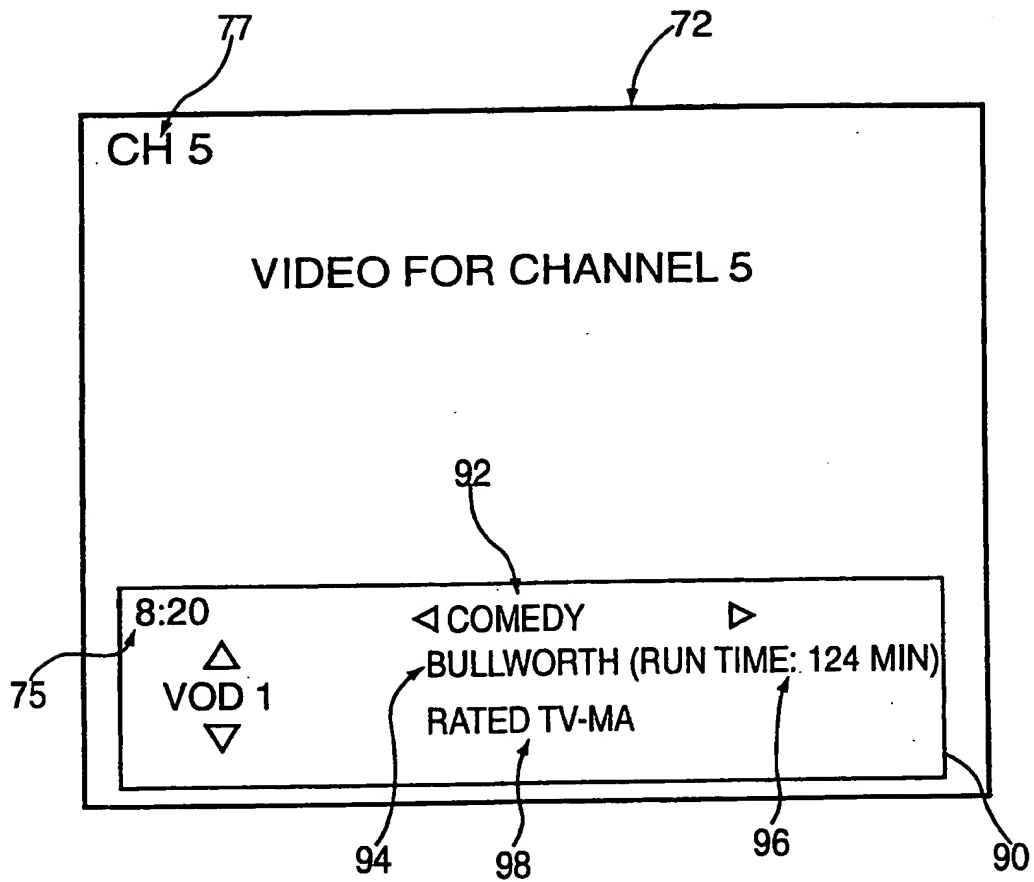


FIG. 8

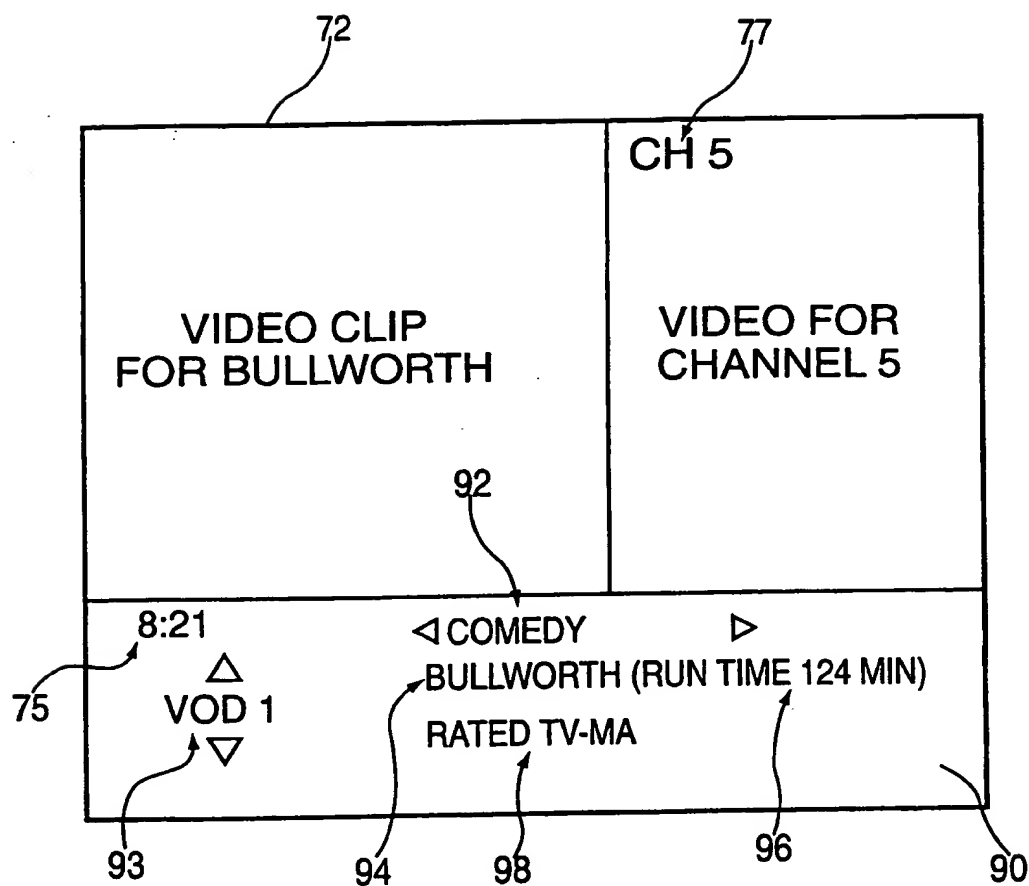


FIG. 9

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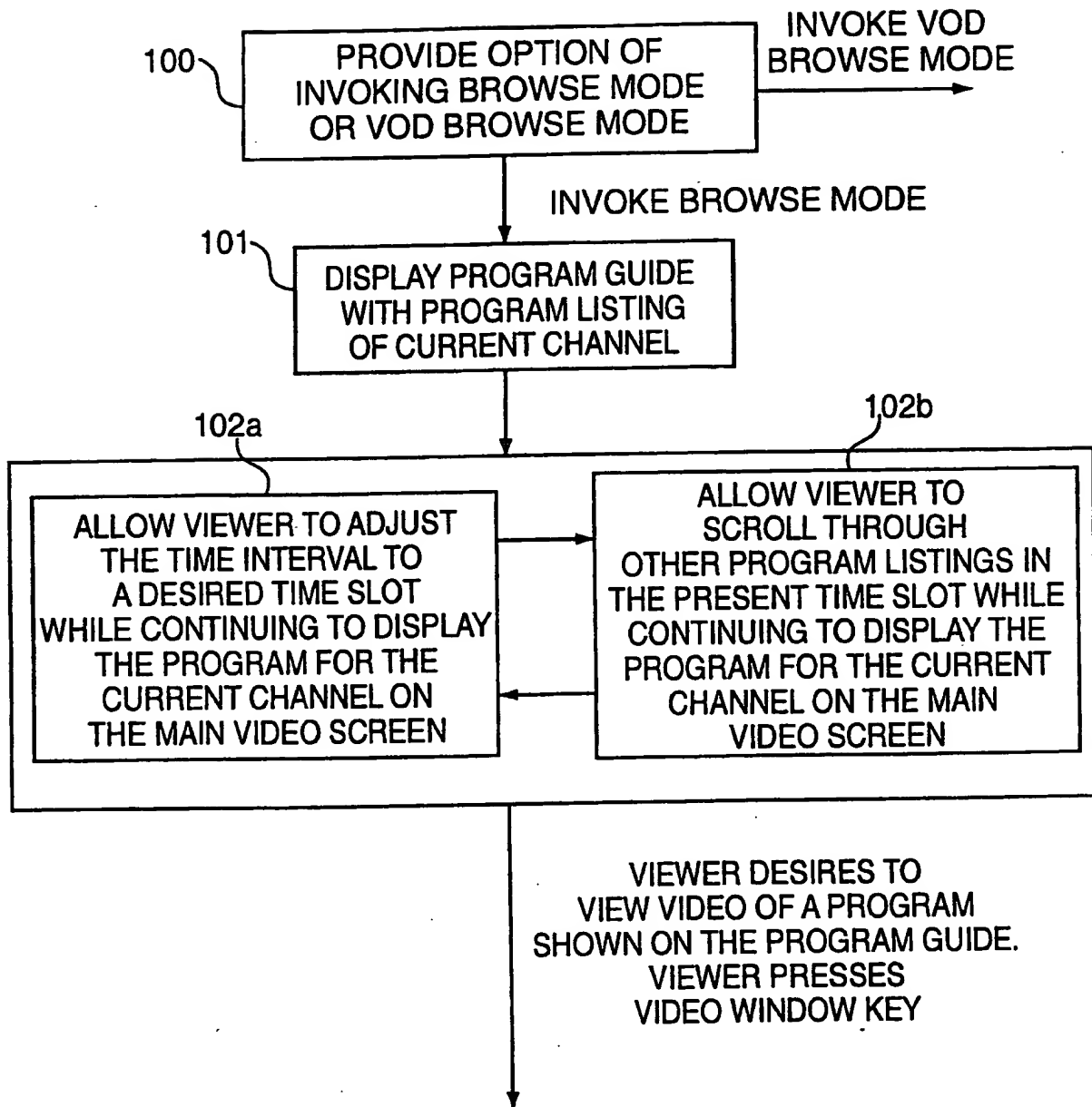


FIG. 10

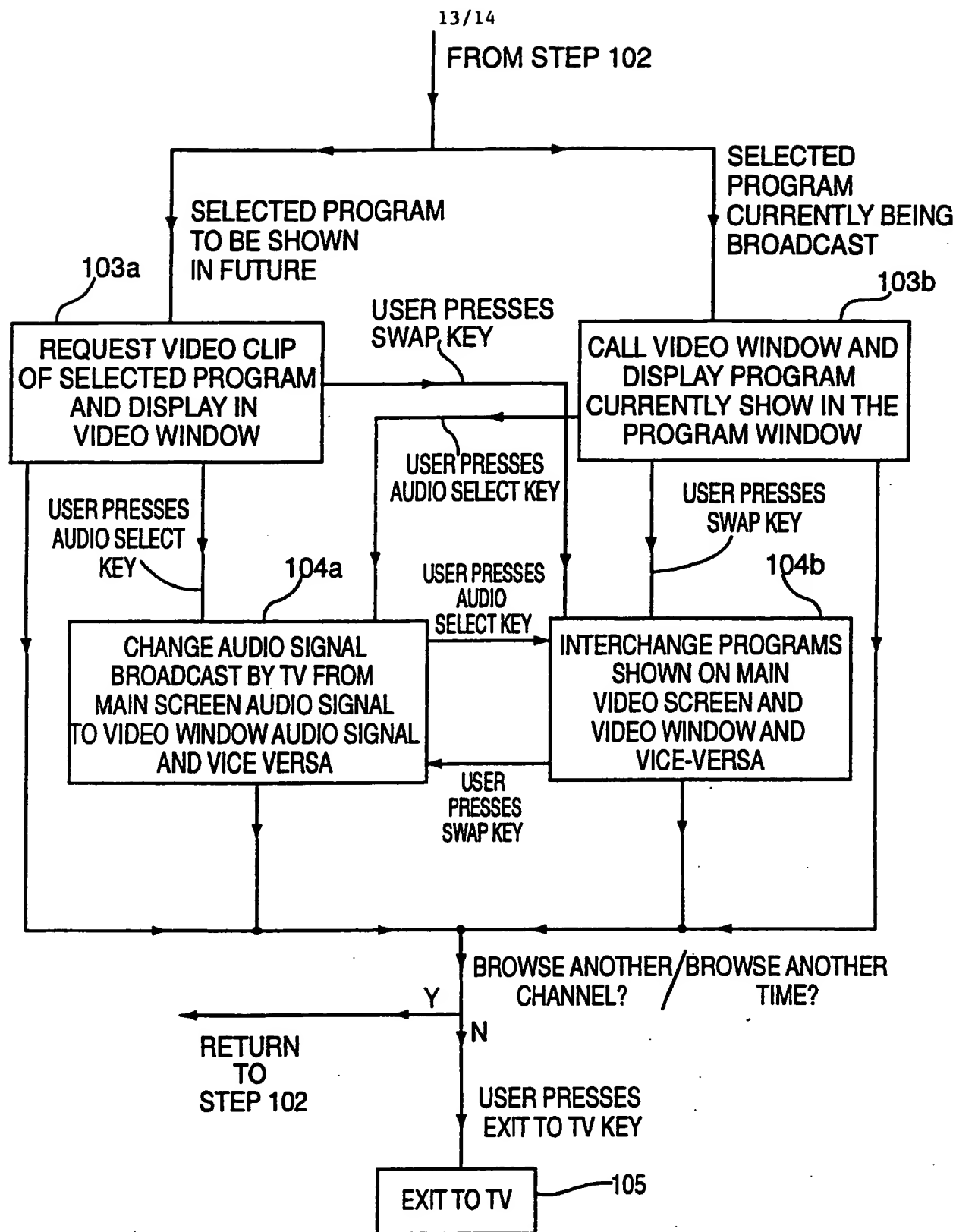


FIG. 11

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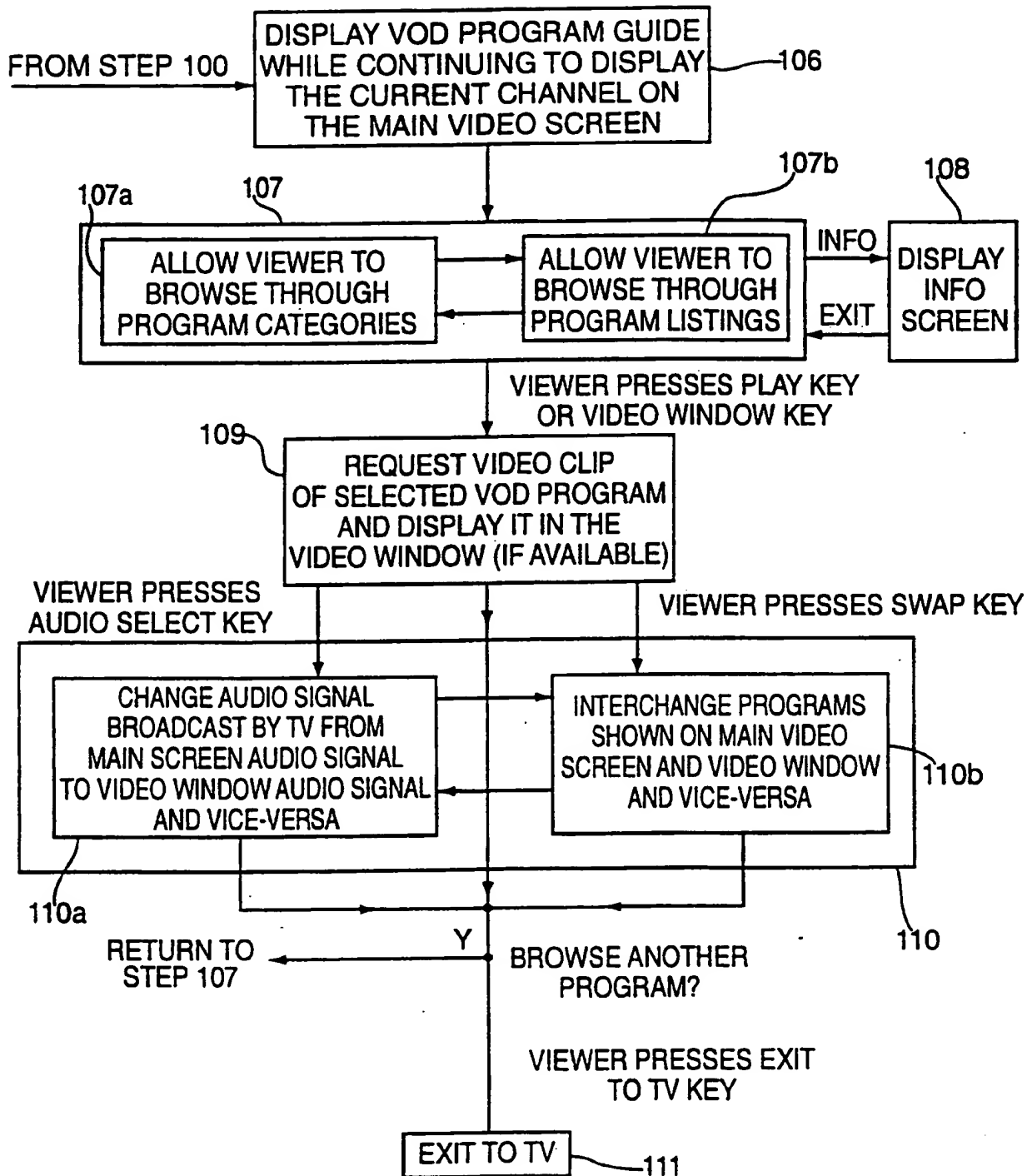


FIG. 12

# INTERNATIONAL SEARCH REPORT

International Application No  
**PCT/US 99/11016**

**A. CLASSIFICATION OF SUBJECT MATTER**  
**IPC 6 H04N5/445**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
**IPC 6 H04N**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 49242 A (HUNWICH KEITH ; SCHEIN STEVEN (US); ALBA THERESA (US); FOLKER DAVID) 24 December 1997 (1997-12-24) page 18, line 19 - page 19, line 20 page 21, line 3 - line 19 -----	1-56

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

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Date of the actual completion of the international search

**5 August 1999**

Date of mailing of the international search report

**11/08/1999**

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Search Application No

PCT/US 99/11016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9749242 A	24-12-1997	AU 3223097 A	07-01-1998